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The *Hypolimnas octocula* Complex, with Notes on *H. inopinata* (Lepidoptera, Nymphalidae)

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Synopsis The taxonomy and zoogeography of the *Hypolimnas octocula* species-group is revised. Three new subspecies of *octocula* are described and figured, while *lifuana* is nominated a local form of *o. elsina* ; *formosa* and *pallas* are placed in synonymy under *o. octocula* and *o. perryi* respectively. Field notes, including the life-history of *o. octocula* are supported by photographic records. *H. arakalulk* is raised to specific rank, to which *marianensis* is newly combined as a subspecies. The allied species *errabunda* and *exiguus* are also discussed and figured, as is the little -known taxon *inopinata*.

Introduction

It will be seen that the *octocula* group accommodates two species, each ranging over several islands. The first of these are the *octocula* subspecies, occupying islands of Vanuatu (formerly the New Hebrides), New Caledonia and the Loyalties, Fiji, Tonga and Samoa. The second comprises *arakalulk* SEMPER (1906) **stat. n.** (formerly of *octocula*), of which two subspecies are known, apparently confined to the western Carolines and southern Marianas ; approximately 4000 km (2485 ml) northwest of the most northerly known habitat of *octocula* (Fig. 4).

It is important to note that San Cristobal Is. in the southern Solomons (Fig. 4) has a species of *Hypolimnas* : *exiguus* SAMSON (1980b) (Fig. 1c, d), which exhibits characters of wing pattern to be met with in both *octocula* and the New Guinea species *deois* HEWITSON (1858) (Fig. 1a, b).

In the past there has been much confusion regarding application of correct subspecific names to specimens of *octocula*. This uncertainty of placement was largely due to its sparce representation, even within major collections. The present paper has been significantly prompted by the efforts of the late J. A. BURGESS and Dr. G. S. ROBINSON, both of whom — albeit independently — travelled extensively the islands of Vanuatu (New Hebrides) ; their field-work and specimen data appearing throughout this paper. Such BURGESS specimens, now in a multitude of institutions are abbreviated JAB within the text. ROBINSON's specimens were collected primarily during the Royal Society and Percy Sladen New Hebrides Expedition of 1971, are now in the British Museum (Natural History) and abbreviated GSR (BM). Further establishments are identified thus : — AM, Australian Museum, Sydney ; ANIC, Australian National Insect Collection, Canberra ; SAM, South Australian Museum, Adelaide ; ORSTOM, Office de la Recherche Scientifique Outre-Mer, Nouméa ; PBM,

Bernice P. Bishop Museum, Honolulu; AME, Allyn Museum of Entomology, Sarasota; AMNH, American Museum of Natural History, New York; CAS, California Academy of Science, San Francisco; HEC, Hope Entomological Collections, Oxford; MNHN, Muséum National d'Histoire Naturelle, Paris; RNH, Rijksmuseum van Natuurlijke Historie, Leiden.

In addition to the terms holotype and paratype, the author has chosen to perpetuate the term allotype, although not regulated by the Code (Rec. 72a), for use on a designated specimen of opposite sex to the name-bearing holotype. A designated specimen of opposite sex is as significant as the one first described, and should rank accordingly in the nomenclature.

I. The Taxonomic Location of *octocula* and *arakalulk* in Relation to Allied *Hypolimnas*

pandarus L. various subsp. Buru, Ceram & outliers
saundersii HEWITSON various subsp. Timor, Wetar & outliers
deois HEWITSON various subsp. New Guinea & outliers
exiguus SAMSON monotypic, Solomons: San Cristobal & Santa Ana
arakalulk: —
subsp. *arakalulk* SEMPER Carolines: Palau & Babeldaob
subsp. *marianensis* FRUHSTORFER Marianas: Saipan & Guam
octocula: —
subsp. *octocula* BUTLER Fiji, central & northern Vanuatu, ?Tonga.=(*formosa* HERRICH-SCHÄFFER)
subsp. *samoa* SAMSON Samoa
subsp. *elsina* BUTLER New Caledonia & Loyalties: Ouvéa, Lifu & Maré.
f. *lifuana* BUTLER Loyalties: Lifu
subsp. *tanna* SAMSON Vanuatu: Tanna, ?Aneityum
subsp. *perryi* BUTLER Vanuatu: Erromango.= (*pallas* GROSE-SMITH)
subsp. *futunaensis* SAMSON Vanuatu: Futuna
errabunda HOPKINS monotypic, Samoa: Upolu & Savai'i
pithoeka KIRSCH various subsp. New Guinea through Solomons to Vanuatu
antilope CRAMER various subsp. S. E. Asia eastward to the Cook Islands

II. The Subspecies of *Hypolimnas octocula*

1. *H. octocula octocula* in Fiji, Tonga and central & northern Vanuatu

Hypolimnas octocula octocula (BUTLER)

Diadema octocula BUTLER, 1869, *Ann. Mag. nat. Hist.*, **4** (3): 19–20, pl. IX, fig. 5.
Diadema formosa HERRICH-SCHAFFER, 1869, *Stett. Ent. Zeit.*, **71** (16): 4, fig. 17. (Currently treated as a variant of *o. octocula*) **Syn. n.**

Distribution: Fiji (Vanua Levu, Ovalau, Mango, Thithia, Kandavu, Totoya); ? Tonga (Mango); Vanuatu (Vanua Lava, Mota Lava, Santo, Malekula, Ambae [the current spelling, formerly as Abo, Aoba & Oba], Maewo, Pentecost, Ambrym, Paama, Epi, Efaté).

Original description

BUTLER's description of nominate *octocula* from Fiji follows. It is important to note that his holotype 'female' is infact a male (Fig. 1e).

> ♀ [♂]. Alae supra nigro-fuscae: antice fascia postmedia obliqua ferruginea, ocellaque anali nigro indistincte pupillato fusco-ferrugineo cincto: posticae fascia lata submarginali intus dentata ferruginea a venis nigris intersecta et puncta septem nigra ocellaria caeca inter venas includente; linea vix distinguenda obscre ferruginea undulata marginali; striola anali squamosa caerulea: corpus negro-fuscum. Alae subtus pallidiores; fusciis striaque marginali supernis pallide roseo-albidis brunneo variis: anticae characteribus quatuor discoideis subcostalibus, punctis quinque subapicalibus unaque majore anali caeruleo-albidis nigro cinctis, linea submar ginali nigra: posticae ocellis septem nigris albido pupillatis; stria submarginali lunulari nigra, striola superna anali caeruleo-albida: corpus fuscum. Exp. alar. unc. 3, lin. 4.

Literature problems

BUTLER (1869) gives the type-locality of *octocula* as "Island of Tologa, Coll. DRUCE", adding to the confusion of his wrongly sexed holotype. Actual data of this male specimen reads "Island of Toloya". Both spellings are apparently inaccurate and should read Totoya. BUTLER (1877) mentions possible females of *octocula*, giving brief mention to previously recorded localities for the species: "Vate and Totoya." The former should be refered to as Efaté (Vanuatu), while Totoya is the correct spelling for the crescent-shaped atoll in the Lau (Moala) group of Fiji, southeast of the main island of Viti Levu (Fig. 4).

Another misinterpretation of the type-locality is to be found in FRUHSTORFER (1903 & 1912). In the latter, preceeding brief mention of both male and female *o. octocula* adds: "Described from Tologu." This is perpetuated by SWEZEY (1942), during whose discussion of the then *H. octocula marianensis* states: "The species *octocula* was described from Tologu which WALLACE suggested might be Gilolo." It will be noted that Gilolo is on the island of Halmahera in the northern Moluccas, where *octocula* is unrepresented.

Fijian and Tongan specimens examined (Figs. 1e – g)

ROBINSON (1975) submits a Fijian distribution: "Ovalau, Mango, Thithia, Kandavu. Very rare in Fiji ...." To these islands we may add Totoya [Toloya] and Vanua Levu as follows: —

FIJI: Holotype ♂ Isld. of Toloya (BM); allotype ♀ Obalau Island, Fiji, R. BAXANDALE (BM); 1 ♂ Kandavu I., Vunisea, Tavuki track, 31. viii. 1973, MCLEAN

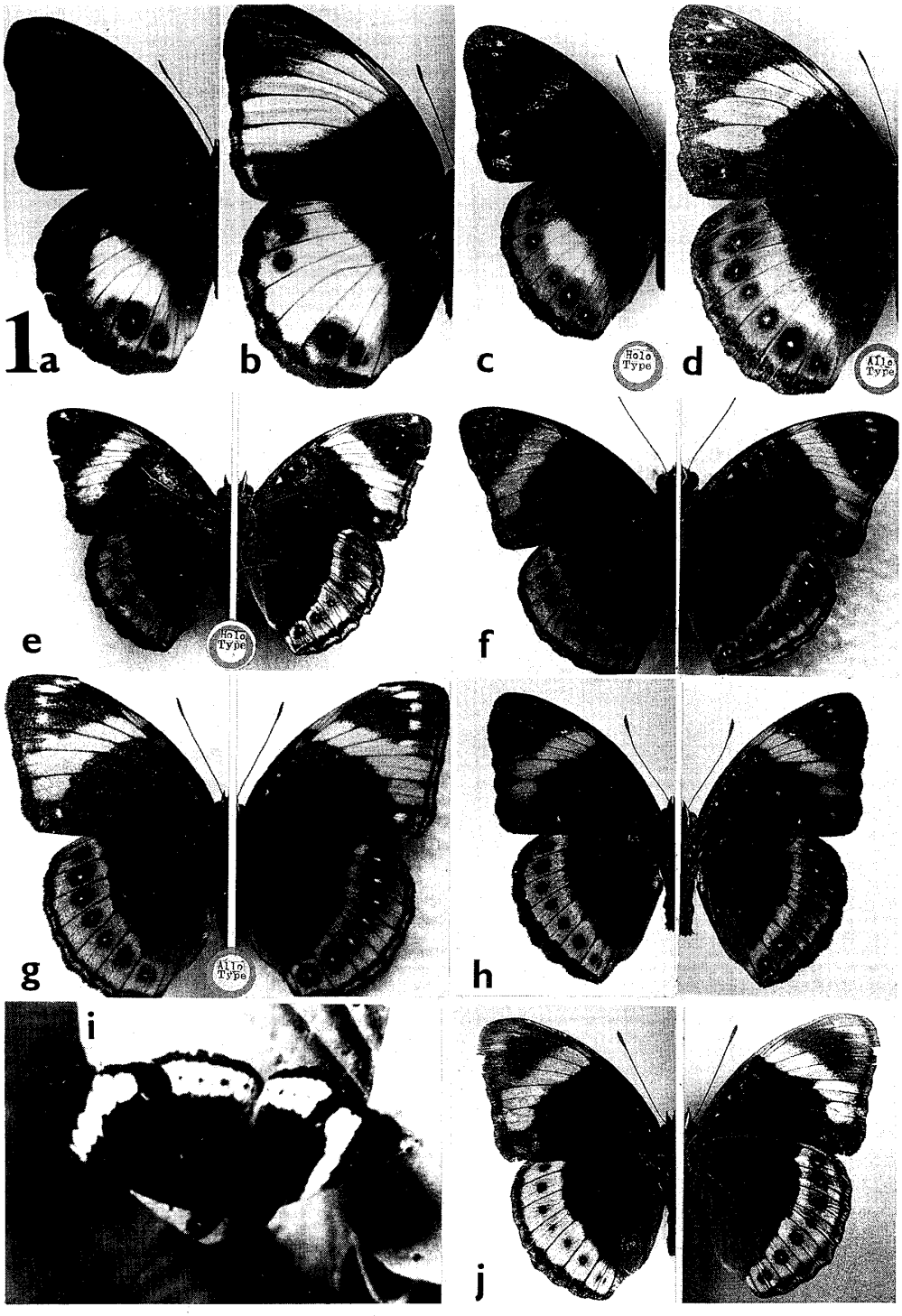

Fig. 1. **a, b**. *Hypolimnas deois divina*: a. ♂, Papua, Itiki Numu, 17. xii. 1962 (author); b. ♀ New Guinea, Garaina, 2300 ft, v. 1974 (author). **c, d**. *H. exiguus*: c. holotype ♂, Solomons, Mapwe, natural forest area, 200 ft, Santa Ana I, 6. vii. 1974 (AME); d. allotype ♀ Solomons, Gupuna, Santa Ana I, 20. vi. 1974 (AME). **e – j**. *H. o. octocula*: e. holotype ♂, Isld. of Toloya (BM); f. ♂, Mango Island (BM); g. allotype ♀, Obalau Island, Fiji (BM); h. ♂, nr. Port-Vila, Efaté I, New Hebrides, 6. vii. 1975 (author); i. var. *formosa* ♂, in hill-forest, n. e. Mele-Maat, Efaté, Vanuatu, 17. i. 1983 (author); j. var. *formosa* ♂, Pentecost I, nr. Melsissi, 1 – 10. viii. 1976 (AME).

(BM); 1 ♂ 1 ♀ Vanua Levu, Savusavu, 5–8. viii. 1974, GSR (BM). ?TONGA: 1 ♂ Mango Is. (BM).

The above Mango Island male may refer to that of the Lau group of Fiji, or that of the Ha'apai group of Tonga.

Central and northern Vanuatu

Vanuatu, including the Banks and Torres groups, form an incomplete double chain of approximately eighty islands, occupying an area northwest to southeast for 725 km (450 ml). Of these islands, approximately forty are mountainous, the remainder consisting of forty islets and rocks. The larger islands are high: Mt. Tabwemasana on Santo ascends to 1880 m (6169 ft), exhibiting extensive exposures of volcanic rock underlying areas of raised coral terraces, densely forested. Smaller islands in the group are often completely volcanic.

The nominate subspecies of *octocula* is present on Efaté Is. and northward. This distribution is discussed in the following, while islands south of Efaté will later be seen to represent further subspecies.

Specimens examined

EFATÉ (Figs. 1h, i & 2a, b, d, h): 2 ♂ nr. Port-Vila, 6. vii. 1975, JAB (AME); 1 ♂ 1 ♀ as preceeding but 20. xii. 1975; 1 ♀ as preceeding but 23. xi. 1975; 1 ♂ W. Efaté Island, Creek Ai, June 1976, JAB (author); 4 ♂ 2 ♀ Port-Havannah, vi. 1976, JAB (author); 9 ♂ 2 ♀ Vila, 11. vii. 1971, GSR (BM); 1 ♀ as preceeding but 15. vii. 1971.

During February 1983 the author observed one male with white fore and hindwing bands, placed parallel to the orange ones. Female variants, one very pale, the other of fuscus colouration appear infrequent (Fig. 2b, d).

The island of Efaté is 42 km (26 ml) by 22 km (14 ml), rugged and covered with tropical rain-forest.

PENTECOST (Fig. 1j): 2 ♂ 2 ♀ Central Pentecost Is., 1000 ft, 3. viii. 1976, JAB (author); 1 ♀ nr. Melsissi, 1–10. viii. 1976, JAB (AME); 4 ♂ 1 ♀ Pentecost Island (RNH).

Pentecost, 61 km (38 ml) long and 12 km (8 ml) wide, has a central mountain range which rises to 935 m (3065 ft) in the centre of this elongated island. There are numerous fertile valleys and many permanent streams on the western side.

EPI: RINDGE (pers. comm. 1982) presents the following data: 6 ♂ 1 ♀ Api (Epi) Island, New Hebrides, August 1925 (AMNH).

The densely wooded island of Epi rises in the centre to Tavani Kutali (or Nikalo), a sharp summit 844 m (2770 ft) high.

AMBAE, formerly Abo, Aoba, Oba, Lepers (Fig. 2c): 1 ♂ Abo, Nues. Hébrides (BM); 1 ♀ Lolopuepue, Oba (BM). RINDGE (pers. comm. 1982) presents the following data: 1 ♂ Lepers Island, New Hebrides, January 17, 1927 (AMNH).

This island is 38 km (24 ml) long and 14 km (9 ml) across, rising in places to about 1220 m (400 ft). Lakes are present in the interior.

MALEKULA: 1 ♂ 1 ♀ SW Bay-Wintoua, 8–11. x. 1971, GSR (BM); 1 ♀ Ounua,

Mar. & Apl. 1929, Miss L. E. CHEESMAN (BM).

Second largest island of Vanuatu (after Santo), being 88 km (55 ml) long and in places, 24 km (15 ml) across. A broken range runs the length of the island, rising to Mt. Penot, 892 m (2925 ft). The western portion is rather inaccessible, yet the long eastern coast has numerous harbours and bays, with streams tracing back through undulating, well wooded country. Smaller islands are present off the northeast and south coasts.

ESPÍRITU SANTO (Santo): 1 ♂ Esperito Santo, 5. 30. 43, R. H. DAGGY (CAS); 21 ♂ 8 ♀ Narango, South Coast, 24. 5–25. 7. 1960, W. W. BRANDT (ANIC); 1 ♂ Apouna R. Camp, 2–450', 26–27. viii. 1971, GSR (BM); 2 ♂ 1 ♀ Luganville, Santo (RNH).

SACCO (pers. comm. 1983) comments that *octocula* is most plentiful on the island during May.

Santo is the biggest island of Vanuatu, being 122 km (76 ml) long and 72 km (45 ml) wide; heavily wooded, well watered and having a mountain range along its western division, with a peak — Mt. Tabwemasana — rising to 1880 m (6169 ft). There are small islands off the east coast.

BANKS GROUP: 3 ♂ N. New Hebrides, Banks Islands, Mota Lava, Jan. Feb. 1976, JAB (AME).

These islands consist of a scattered group lying 80 km (50 ml) northeast of the main islands of Vanuatu. Vanua Lava and Gaua are each about 24 km (15 ml) long and 19 km (12 ml) across. The group is of volcanic origin, very fertile with high rainfall and associated luxuriance.

No records seem available from the Torres group (Fig. 4) to the northwest of Banks. Sightings have been reported from Paama and Maewo; it is therefore probable that the nominate subspecies of *octocula* occurs on the majority of forested islands in central and northern Vanuatu. Allied *Hypolimnas* may yet be discovered in the Santa Cruz group further north (Solomons, Fig. 4), as Lepidoptera of these islands demonstrate many interesting affinities to those of the southern Solomons (particularly the San Cristobal group) and the islands of Vanuatu (SAMSON 1979 & 1980).

The *formosa* variant of *o. octocula*

An infrequent but widespread variant (most likely in the male) is depicted (Fig. 1i, j), in which marginal and submarginal areas are ornamented with pale-brown and orange; the forewing bands deviating submarginally, extending towards the subapex with inferior hindwing black spots. D'ABRERA (1971) figures both sexes of *o. octocula* in colour, the male of which relates to this variant. HERRICH-SCHÄFFER (1869) described and figured a similar male (now lost) from "Vanua Valava" (Vanua Lava, Banks group), affording it specific rank as *Diadema formosa*. HERRICH-SCHÄFFER's original description follows: —

> Zur Gruppe von *pandarus* gehöring und von HEWITSON als eine Var. vermuthet; kleiner, schwarzbraun mit orangem Schrägband der Vfl und solchem breiten vor dem Saume der Hfl, in welchem gleich grosse schwarze

Rundflecke von Z2 – 4, in ZIc zwei kleinere stehen. Unten sind diese Flecke und gleiche der Vfl auf die Ränder der mehr rostbrauen Binde Beschränkt. Von Vanua Valava.

The name *formosa* is herewith made available to denote such significant variation, and is known to the author from Efaté, Pentecost, Ambae, Santo and Vanua Lava. It may be found to predominate on certain islands, or within specific areas of central and northern Vanuatu. *H. o. octocula* var. *formosa* should not be confused with *o. elsina* BUTLER (1877) (Fig. 5) from New Caledonia and the Loyalties, which exhibits a fairly constant and substantial extension of colouration in forewing spaces 1a – 1b.

Observations of *o. octocula* in the field

Between January and March 1983, the author observed the nominate subspecies throughout Efaté Island (Vanuatu), preferably in association with primary forest (lowland and raised coral), cloud-forest and related secondary growth; rarely in strand and grassland (Fig. 2j). Males were more obvious although never abundant, contesting territorial stations with *Hypolimnas bolina nerina* F. (1775), *Doleschallia bisaltide herrichi* BUTLER (1875), *Yoma s. sabina* CRAMER (1780) and rarely *Parthenos sylvia thesaurinus* GROSE-SMITH (1897) (Nymphalidae).

Several instances were recorded during which single examples of *H. octocula* and *D. bisaltide* fell prey to the orb-web spiders, *Nephila* species and *Argiope appensa* WALCKENAER (1841). The former, a large Golden Silk species in primary forest; the latter widespread through open country and secondary forest, frequently in association with the plant *Lantana camara* L. (1753) (Verbenaceae). Both spiders are apparently major predatiors of diurnal and nocturnal Lepidoptera.

Unlike the male, females of *octocula* were observed rarely at moisture or flowers, maintaining a purposeful flight through sunlit areas, frequenting dense cover in search of a larval food-plant on which to oviposit.

The life-history of *o. octocula*

A female was observed 16. i. 1983 in hill-forest on Pango-Efaté (Fig. 4). Fifteen pale-green, longitudinally ridged ova (diameter 1 mm) were deposited on the underside of a leaf of *Cypholophus macrocephalus* WEDDELL (1853) (Urticaceae); Fig. 2e. All larvae emerged 23. i. feeding only in shady situations during daylight, apparently continuously at night. Colouration was black with numerous spines, the larvae being gregarious until the last moult, entering the pupal stage after approximately 19 days. Fourth instar larvae measured approximately 50 mm in length; colouration prodominantly black, as was the pair of long spines on the head. Body was covered with rows of branched spines with bristles. Brown ornamentation on segments similar in extent to *H. bolina nerina* and *H. antilope mela* FRUHSTORFER (1903), although much subdued.

After wandering off of the food-plant, the larvae (Fig. 2f) pupated around 11. ii., suspended head downward. The pupae (Fig. 2g) were deep orange-brown 25 mm in length, the duration of this stage being approximately seven days. Of the fifteen larvae two were confined, both producing male adults 17 – 18. ii. 1983 (Fig. 2h); the remainder

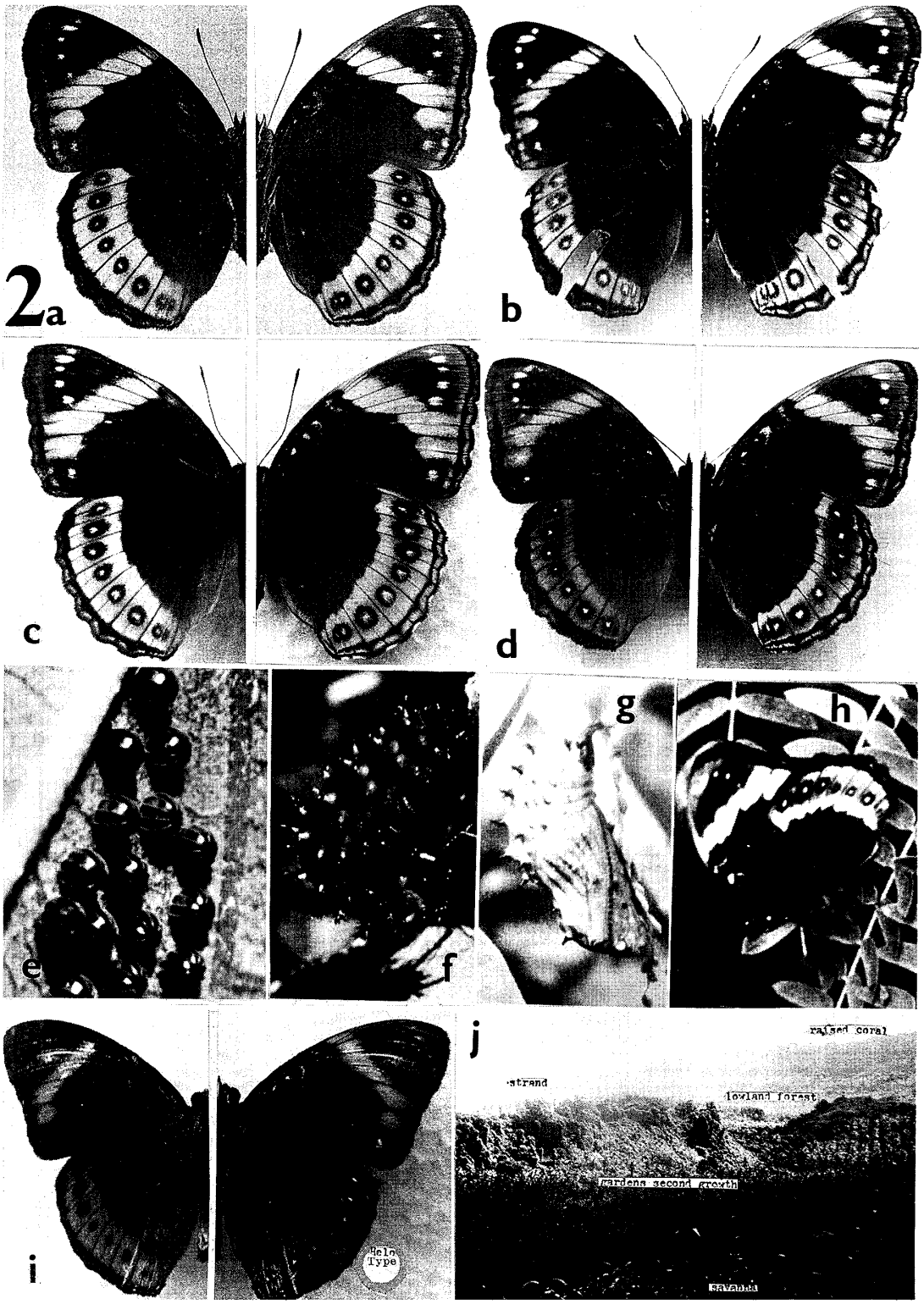

Fig. 2. **a – h**. *H. o. octocula* in Vanuatu: a. ♀, nr. Port-Vila, Efaté I, 20. xii. 1975 (AME); b. ♀, Vila, Efaté I, 11. vii. 1971 (BM); c. ♀, Lolopuepue, Oba (BM); d. ♀ Vila, Efaté I, 15. vii. 1971 (BM). Early-stages, hill-forest, Pango, Efaté I: e. ova, 16. i. 1983; f. larva, 10. ii. 1983; g. pupa, 12. ii. 1983; h. imago ♂, 18. ii. 1983 (author). **i**. *H. octocula samoa*: holotype ♂, Samoa (BM). **j**. Habitat types on Efaté I.

were allowed to disperse.

In addition to *C. macrocephalus*, larvae were observed feeding on *Pipturus argenteus* FORST. (1869) (Urticaceae) and *Portulaca oleracea* L. (1753) (Portulacaceae); also possibly *Acalypha* species (Euphorbiaceae). On Efaté, larvae of *H. bolina* and *H. antilope* were found independently on *P. argenteus*; the former also on *Pseuderanthemum dicolor* SCHRANK (1817) and *Hemigraphis reptans* FORST. (1786) (Acanthaceae).

The three species of *Hypolimnas* were frequently observed flying within the same locality, most obviously as males, *bolina* being strongly territorial, while *antilope* exhibited less strenuous habits.

2. A new subspecies of *octocula* from Samoa

Hypolimnas octocula samoa SAMSON subsp. n.
(Fig. 2i)

♂ Forewing length: 39 mm. Dorsal surface: Forewing bands notably subdued in colouration; a grey-brown, not orange as in *o. octocula*. Although the hindwing is similar in extent to that taxon, that of the forewing is but two-thirds of the width by comparison. Ventral surface: Forewing band somewhat paler than on the dorsal surface, although exhibiting a similar extent. Hindwing band is evident but inferior, occupying the discal area with grey-brown scales.

Type material: Holotype ♂ Samoa (BM). This solitary male shows some alliance in wing-colouration to *Hypolimnas errabunda* HOPKINS (1927) (Fig. 7g, h), also from Samoa.

3. The subspecies of *octocula* from Tafea (or southern) Vanuatu

H. o. octocula is replaced by three subspecies on Vanuatu islands south of Efaté (Fig. 4). It would appear that subspeciation at this zoogeographical point is not restricted to *octocula*, or indeed to other Lepidoptera (SAMSON, 1982, 1983 & 1984), and is supported by evidence from several other faunas but in particular their floras.

Hypolimnas octocula perryi (BUTLER)
(Figs. 3a–e, h)

Diadema perryi BUTLER, 1875, *Proc. zool. Soc. Lond.*, **1875**: 613–614, n. 18, pl. LXVII, fig. 3.
Hypolimnas pallas GROSE-SMITH, 1897, *Ann. Mag. nat. Hist.*, **6** (19): 406–407. **Syn. n.**

Distribution: Vanuatu, Tafea (Erromango Is.)

Original description

BUTLER wrongly sexed his holotype specimen as a male. It is a female; his

female stands correct (Figs. 3b, d). FRUHSTORFER (1912) gave reference to BUTLER's drawing, correctly identifying it as a female, although giving no mention of the latter's mistake.

♂ [♀] Wings above deep brown; several streaks across the cell, a broad oblique submedian diffused band, and two submarginal undulated bands separated only by a black line, pale brown; a bifid subapical costal spot placed obliquely on the subcostal branches, and six rounded discal spots parallel to the margin, all white with a narrow lilacine edging; secondaries with the discal area from just beyond the cell abruptly paler, becoming tawny ochreous externally, and bounded near the outer margin by a series of ochreous lunulated spots; centre of discal area traversed by eight violaceous ocellated spots with white pupils and black margins; outer margin dark brown intersected by a lunated paler brown line; fringe white-spotted: body black-brown: wings below paler than above, all the markings lighter, the discal spots larger, pale blue with white centres and black edges: body brown, legs and palpi streaked with white: expanse of wings 3 inches 11 lines.

♀ paler than the male, the lighter parts especially; postmedian band of primaries sordid white; ocelli smaller: expanse of wings 3 inches 11 lines.

Erromango, New Hebrides, 10th May, 1875. This is one of the finest species that has hitherto come from the South Seas.

Synonymy

Currently placed as a synonym of *o. perryi, Hypolimnas pallas* provides us with the earliest reference to a male of the Erromango subspecies. Described and figured by GROSE-SMITH (1897 & 1898 respectively), the specimen is figured herein (Fig. 3a).

Original description

Male. — Upperside. Both wings brown. Anterior wings crossed obliquely half-way between the end of the cell and the apex by an obscure ferruginous band, commencing on the costa and becoming obsolete between the two upper median nervules some distance before reaching the outer margin; a subapical oval white spot, followed by an elongate ferruginous streak extending nearly to the oblique ferruginous band. Posterior wings with a broad fulvous submarginal band across the disc, in which between the veins is a row of black spots, some of which are centred by a minute white spot.

Underside paler brown. Anterior wings with three spots, edged with black, in the cell at its upperside, and an irregular brownish-white streak a little beyond the end of the cell, followed by an irregular triangular broad band of brownish-white, placed obliquely, the base of the triangle resting on the costa and its apex, which is elongated outwardly, terminating on the upper median nervule; a pale brownish-white patch a little before the apex; a row of seven black spots centred with white crosses the disc beyond its middle, outside which are two submarginal sinuate pale brown lines. Posterior wings closely resemble

those of *H. Formosa*, HER.-SCHAFF., but the pale band, which crosses the disc of that species in which the spots are situated, is more obscure.

Expanse of wings $3\frac{1}{2}$ inches. Hab. New Hebrides. In Mr. H. GROSE-SMITH's Collection. Nearest to *H. Formosa*, but a much larger insect, and the wings are more elongate.

The male specimen is without locality data, bearing a label: "New Heb., ex. GROSE-SMITH, 1910" (BM). FRUHSTORFER (1912) may have been first to presume the general distribution of *pallas* as "the Southern New Hebrides", for although he too supposedly had no data regarding this insect, it seems that the distributions of several other *octocula* subspecies were known to him and thus, by elliminating these, was left with the southern islands; more specifically Erromango (Fig. 4).

Specimens examined (Figs. 3a – e, h)

Holotype ♀ (BUTLER's '♂' type) Erromango, 10 May 1875, 75. 63 (BM); 1 ♀ (BUTLER's ♀ type) data as holotype; 1 ♂ (GROSE-SMITH's ♂ type *pallas*) New Heb. ex GROSE-SMITH, 1910 (BM); 1 ♂ Erromango I, Nouankao R. Camp, 3 – 6. viii. 1971, GSR (BM); 2 ♂ 1 ♀ Erromango I, Ipota, 9 – 13. viii. 1971, GSR (BM).

Remarks

Variation in *o. perryi* has been realised principally with reference to male specimens, in the development of fore and hindwing bands which rarely show an affinity to northern *o. octocula*. However, the typical *o. perryi* forewing band is rudimentary, not adjoining the submarginals and confined from space 4 to the costa, broadening towards the discocellulars. A constant characteristic may be found ventrally at the forewing subapex: white spots in spaces 7 and 8 extend, producing a partial band.

It would appear that BUTLER's females (Fig. 3b, d) represent extremes in diminution and development of wing pattern.

The island of Erromango, 56 km (35 ml) long and 40 km (25 ml) broad, is well watered and extremely fertile. There are various interior ranges, rising to Traitor's Head, 914 m (300 ft) high. A number of large permanent streams are present on the east coast, while off the northeast coast lies Goat Island.

Hypolimnas octocula futunaensis SAMSON subsp. n.

(Figs. 3f, g)

♂ Forewing length: 30 – 35 mm. Dorsal surface: Deep brown ground colour, forewing lacking the orange-yellow median band of the nominate subspecies. A series of white spots are present at the subapex. Hindwing submarginal band is tawny, suffused towards the disc; this band being punctuated in spaces 1 to 7 with black ocelli, white centred. Ventral surface: Ground colour is lighter brown distally, all submarginal black ocelli becoming ill-defined, the white centres of which are enlarged. Forewing accommodates white spots, not only at the subapex but also spaces 1b to 5.

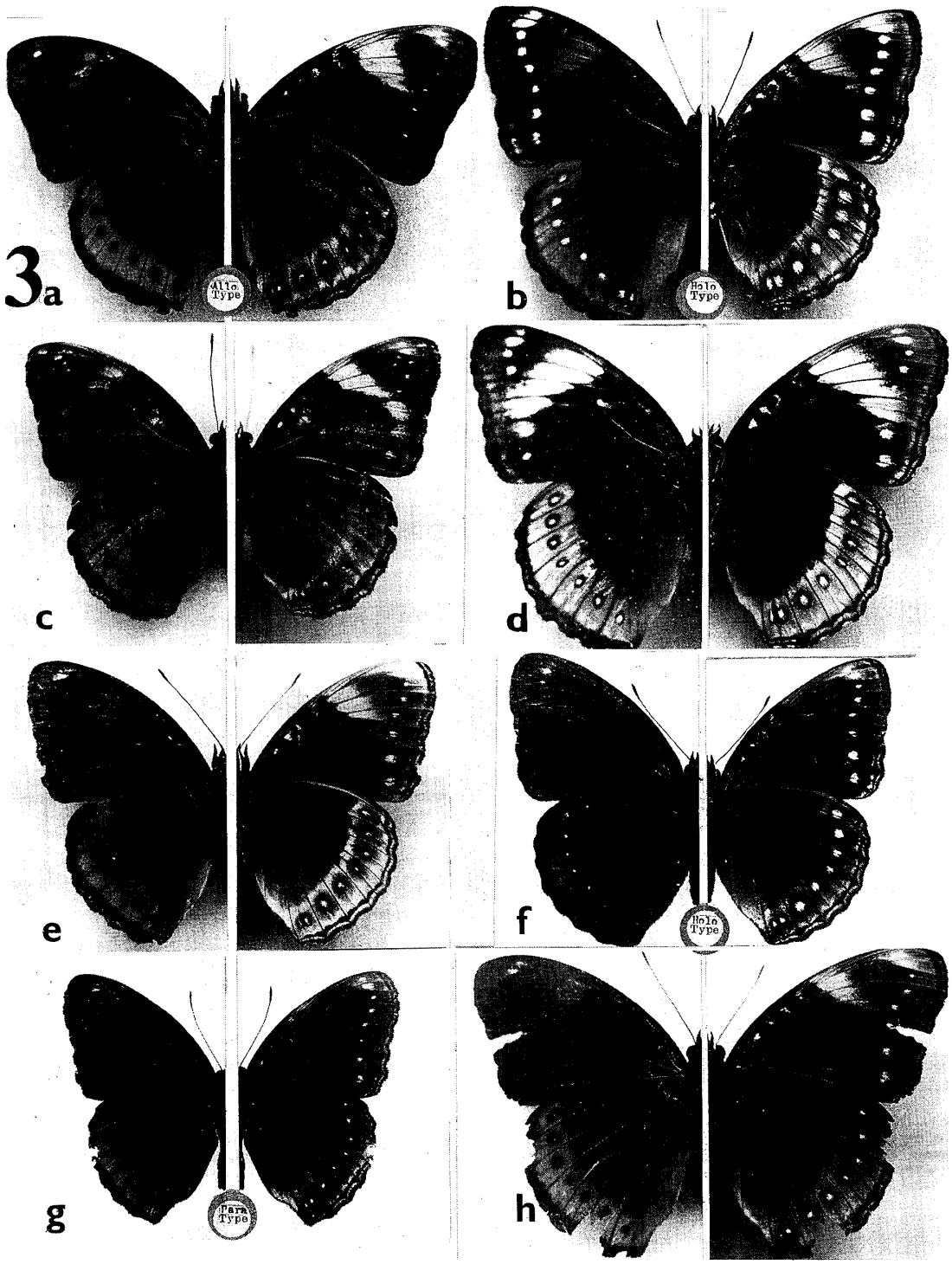

Fig. 3. **a**－**e**, **h**. *H. octocula perryi* on Erromango I, Vanuatu : a. allotype ♂ (GROSE-SMITH's type of *pallas*), New Heb. (BM) ; b. holotype ♀ (BUTLER's '♂' type), Erromango, 10 May 1875 (BM) ; c. ♂, Ipota, 9－13. viii. 1971 (BM) ; d. ♀ (BUTLER's ♀ type), data as (b) ; e. ♂, data as (c) ; h. ♂, Nouankao R. Camp, 3－6. viii. 1971 (BM). **f**, **g**. *H. octocula futunaensis* : f. holotype ♂, S. New Hebrides, Futuna I, 11. viii. 1975 (AME) ; g. paratype ♂, data as (f), but Jan./Feb. 1976 (P. MAYS).

A suffused band is suggested at the discocellulars, not being well-defined as in *o. octocula*. Hindwing discal band poorly developed, bordering the submarginal maculation.

Type material: Holotype ♂ S. New Hebrides, Futuna, 11. viii. 1975, JAB (AME). Paratypes 2 ♂ data as holotype (AME); 1 ♂ as holotype but Jan./Feb. 1976 (P. MAYS, Tarzana, California).

Remarks

Examples of the species *octocula* from Futuna appear to be constantly dark, both dorsally and ventrally; fore and hindwing bands are almost obsolete, although those of the hindwing may be brick-red dorsally. *H. o. futunaensis* is seen to be more extreme than the darkest known examples of *o. perryi*, and indeed of any other *octocula* specimens observed.

The island of Futuna (Erronan), which should not be confused with another Futuna northeast of the Fiji group, contains little more than 10 km^2 (4 ml^2), lying approximately 72 km (45 ml) east of Tanna (Fig. 4) and ascending to a 588 m (1930 ft) peak at its centre.

Hypolimnas octocula tanna SAMSON subsp. n.
(Figs. 6a, b)

♂ Forewing length: 35 – 38 mm. Dorsal surface: The forewing band is restricted, principally in spaces 4, 5 and 6, absent costally. Remaining spaces 1a to 3 exhibit some orange-brown scaling, although much suffused. These, with the exception of 1a are punctuated with deep-brown and black ocelli, at least that of 1b being vaguely pupilled with white. Hindwing band is extended discally when compared with *o. perryi*, thus relating more to *o. elsina* f. *lifuana*. Ventral surface: Forewing band extends to the costa, although lacking in spaces below 3. Bands on all wings are tending to be lanceolate.

♀ Forewing length: 45 mm. Similar in all aspects of pattern distribution to the male; however, orange-brown scaling is suffused with dark-brown.

Type material: Holotype ♂ S. New Hebrides, Tanna Is, nr. Isangel, 19 – 24. i. 1976, C. BURGESS (AME). Allotype ♀ Tanna Is, N. Hebrides, 1977, A. SACCO (Cultural Centre Musem, Port-Vila, Vanuatu). Paratype ♂ Lenakel, Tanna, S. New Hebrides, June 1975, JAB (AME).

Remarks

Specimens of *o. tanna* relate closely to *o. perryi* of Erromango, in the configuration of the forewing band (Figs. 3a, b & 6a, b). However, the extent of wing pattern compares with the basic elements found in *o. elsina* and its form *lifuana* of New Caledonia and the Loyalties. For example, by the greater discal development of the hindwing bands and in the suggestion of a continuous forewing band and intervening ocelli, particularly in spaces 1b and 2.

Two suffused males (Figs. 6c, d) are labelled "Tanna, New Hebrides, 7 & 10. 3. 1964, STRAATMAN/Museum Leiden Verzameling, E. J. NIEUWENHUIS" (RNH). These are placed here as variants of *o. tanna*.

Observations of *o. tanna* in the field

SACCO (pers. comm. 1981) notes the butterfly as fairly frequent, occasionally observed outside the forest, attracted to flowering plants such as *Lantana* species. Favoured situations include light scrub along tracks or among vegetable gardens; very rarely in open country and coconut plantations. SACCO also reared one example from a "black spiny larva" feeding on *Pipturus argenteus*, a food-plant shared by *Hypolimnas antilope mela* and *H. bolina nerina* on Tanna and other islands of Vanuatu.

ROBINSON (pers. comm.) observed examples of *octocula* in the Lenakel area of

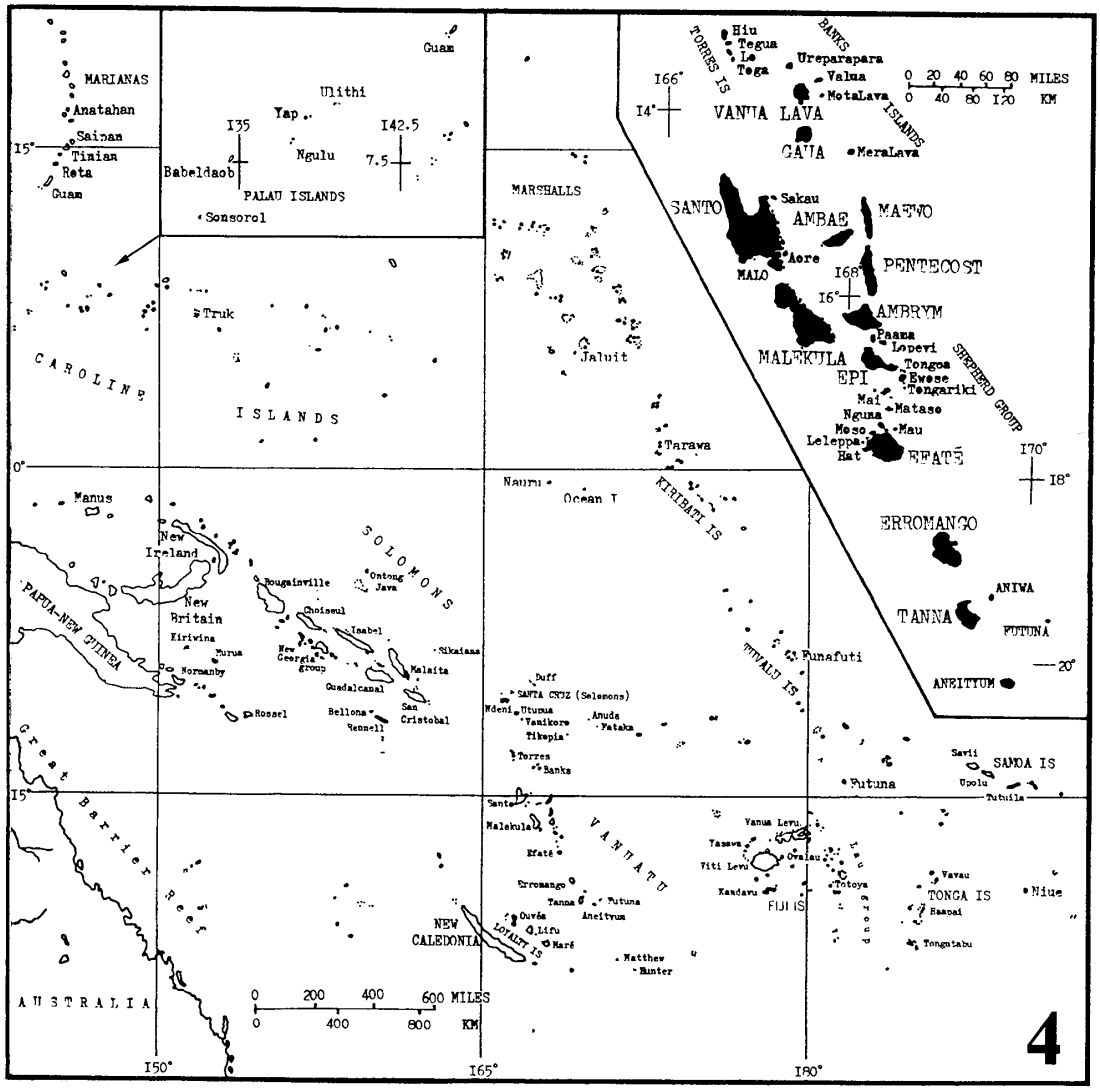

Fig. 4. Map incorporating the western Carolines, southeast through Vanuatu to the Tonga group; the study areas for taxa discussed herein. Map insert: The islands of Vanuatu (New Hebrides), excluding Matthew and Hunter.

Tanna during July 1971. The female of *o. tanna* is only known from the allotype (Fig. 6b); however, this sex has been observed in the field, albeit in lesser numbers than examples of the male, whose habits are more conspicuous. From SACCO (pers. comm. 1981), there would seem to be a factor of some significance regarding female colouration, the hindwing band in particular exhibiting considerable variation, tending towards a pale aspect.

As general information, the island of Tanna is 51 km (32 ml) by 24 km (15 ml) across and of particular interest. Probably the most fertile and attractive land mass in Vanuatu, its southerly position affords an equable climate. It is exceedingly well watered and wooded with various ranges, the highest rising to Mt. Merrin, 1042 m (3420 ft). One of the most accessible active volcanoes in the world — Yasua — is situated three miles from Port-Resolution and one mile from Sulphur Bay.

The author has been unable to locate specimens of *octocula* from Aneityum (Fig. 4), most southerly island of the Vanuatu archipelago (excepting the islets Matthew and Hunter). However, SACCO (pers. comm. 1981) records the species, without clarification regarding subspecific identity. Examples from Aneityum may relate to *o. tanna*.

4. *H. octocula* in New Caledonia and the Loyalty Islands

Two forms of *octocula elsina* are dealt with here: a) f. *elsina* and b) f. *lifuana*.

Hypolimnas octocula elsina f. *elsina* (BUTLER)

Diadema elsina BUTLER, 1877, *Ann. Mag. nat. Hist.*, **20** (4): 351, n. 9, i; SEMPER, 1906, *Iris Deutsche ent. Zeitschr.*, **18**: 255. (as *Hypolimnas elsina*); FRUHSTORFER, 1912, *In* SEITZ, *Gr. Schmett. Indo-Austr.*, **9**: 555. (? as subsp. of *octocula*).

Distribution: New Caledonia; Loyalties (Ouvéa, Lifu, Maré). HOLLOWAY & PETERS (1975) mention "Solomons"?

Original description

> Allied to *D. octocula*, but readily and constantly distinguished by the following characters. Primaries shorter, the orange or tawny belt beyond the cell considerably darker and narrower and with straight margins joining a submarginal streak of the same colour, which tapers from the internal margin, almost to the upper discoidal vein, and encloses a small black ocellus near external angle: secondaries with the broad discal tawny area much deeper in colour, uniform in both sexes, but crossed by similar black ocelli; outer border much narrower and intersected by a tawny line. Primaries below differing principally in the width and straightness of the oblique tawny band; secondaries with the outer border more regular and usually clouded with brown to just beyond the ocelli. Expanse of wings ♂ 2 inches 10 lines, ♀ 3 inches 3 lines.

Specimens examined (Figs. 5a, b, g, h)

Holotype ♂ Lifu, 77. 85 (BM); allotype ♀ as holotype.

NEW CALEDONIA: 1 ♂ Sarramea, 23. vi. 1957, P. COCHEREAU (ORSTOM); 4 ♂ nr. Nouméa, Mt. Koghi, 500 m, 21 Jan. 1976, JAB (author); 1 ♀ nr. Nouméa, 22. x. 1978 (MNHN); 1 ♂ 1 ♀ Tchambourenne (RNH); 1 ♂ Mt. Canala (BM); 1 ♂ New Caledonia (RNH). MARÉ: 1 ♂ Maré (MNHN); 1 ♀ Penelo, 21. viii. 1957, J. RAGEAU (ORSTOM). LIFU: 1 ♂ Lifu, Loyalty Isl. (RNH); also type-specimens of *elsina*. OUVÉA: Field observations by the author, ♂♂ in forest 2 km inland Cape Rossel, Ouvéa, 4. iii. 1983 (Fig. 5e).

Observations of *o. elsina* f. *elsina* in the field

As noted above, the stronghold of *o. elsina* is New Caledonia (Fig. 4), a mountainous island with two parallel ranges, ascending to 1677 m (5500 ft); it is also one of the largest land masses in the Pacific: approximately 400 km (248 ml) by 50 km (31 ml). Like Viti Levu (Fiji), there is a wet and dry side to the island, the southwest coast being dry with somewhat stunted vegetation (WALKER, 1902); however, the northeast coast is wetter and characterised by typical Pacific Island flora: ferns, palms, kauri pines, etc. In relating these conditions to *o. elsina*, it would appear that the insect prefers eastern areas of New Caledonia. In confirmation, HOLLOWAY & PETERS (1975) add that the adult prefers well developed rainforest, emerging from undergrowth to sun itself on leaves, notably in the morning. Furthermore, the above authors submit the following localities for *o. elsina*, as recorded by HOLLOWAY during 1971: Dothio; Poupa; Ouatou R.; Bréhoa R.; Ouambo R.; Col. d'Amieu Forestry Station; Sarraméa; Ouitchambo; Mt. Aoupinié; Port-Boisé; plus a record by STRAATMAN: Pouébo. In addition, the present author observed this insect throughout central and northern New Caledonia during January 1983, in addition to a single sighting on Ouvéa in March of that year (Fig. 5e).

Remarks

From the admittedly small assemblage of study material available, New Caledonian *o. elsina* would appear to show greater stability in size and wing pattern when compared with variation in other subspecies. Yet such uniformity is not duplicated throughout the total range of *o. elsina*, for on Lifu in the Loyalties we are confronted with an extreme form, exhibiting reduced or absent forewing bands and subdued colouration (Figs. 5c, d, f, i). This is discussed in the proceeding section.

Hypolimnas octocula elsina f. *lifuana* (BUTLER) **stat. n.**

Diadema lifuana BUTLER, 1877, *Ann. Mag. nat. Hist.*, **20** (4): 351, n. 9, ii; SEMPER, 1906, *Iris Deutsche ent. Zeitschr.*, **18**: 255. (as syn. of *H. elsina*); FRUHSTORFER, 1912, *In* SEITZ, *Gr. Schmett. Indo-Austr.*, **9**: 555. (as subsp. of *H. o. octcula*).

Distribution: Loyalties (Lifu I).

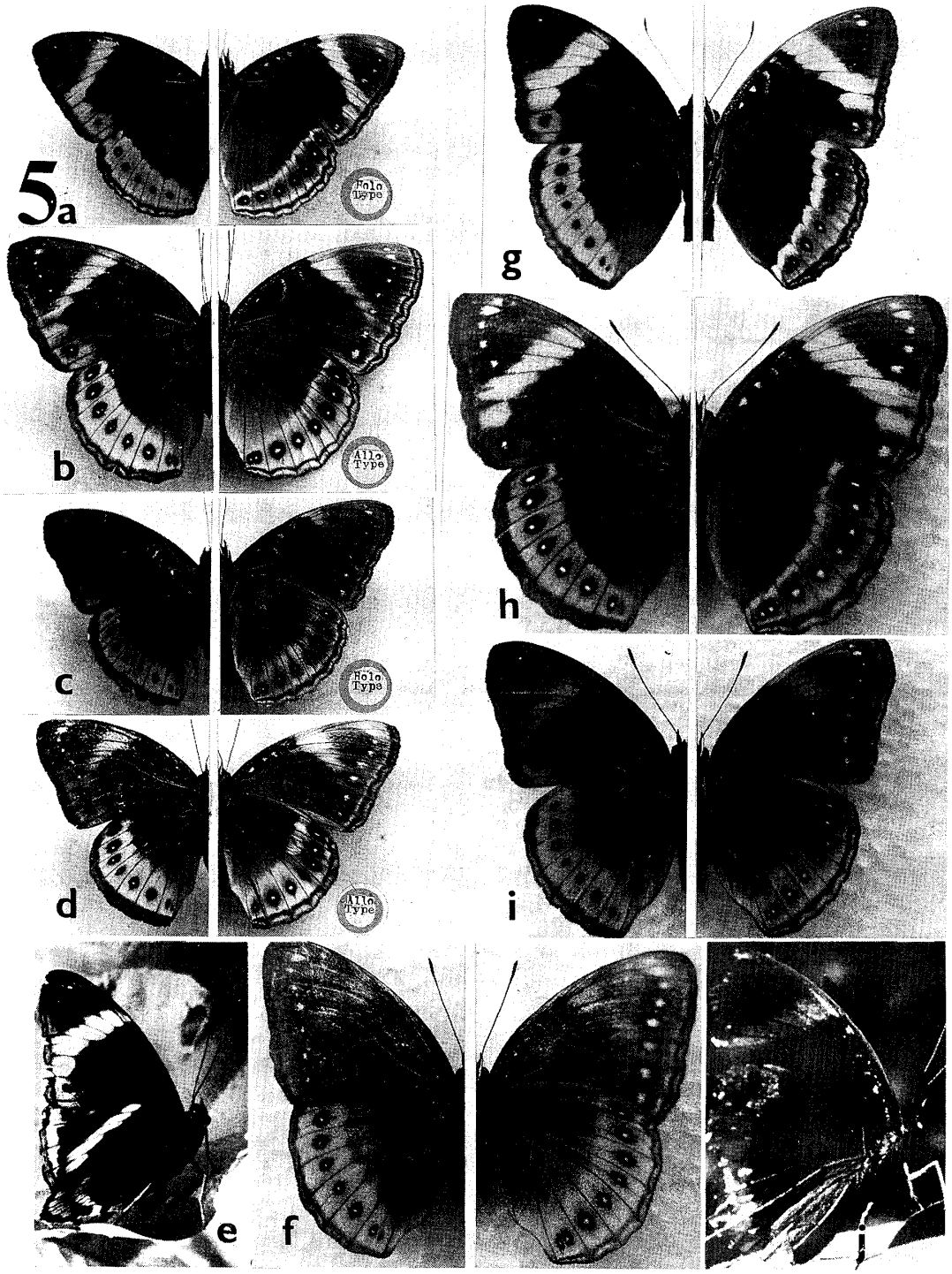

Fig. 5. *H. octocula elsina*: a. f. *elsina* holotype ♂, Lifu, 77.85 (BM); b. f. *elsina* allotype ♀, data as (a); c. f. *lifuana* holotype ♂, Lifu, 77.85 (BM); d. f. *lifuana* allotype ♀, as (c); e. f. *elsina* ♂, in forest 2 km inland Cape Rossel, Ouvéa, Loyalties, 4. iii. 1983 (author); f. f. *lifuana* ♀, Lifu, Loyalty Is, LAYARD (BM); g. f. *elsina* ♂, N. Caledonia, Mt. Koghi, 500 m, 21. i. 1976 (AME); h. f. *elsina* ♀, Loyalty (BM); i. near f. *lifuana* ♂, Lifu (BM); j. f. *lifuana* ♂, hill-forest 8 km n. w. Zoangani, Lifu, Loyalties, 2. iii. 1983 (author).

Original description

♂. Above dark chocolate-brown; a tapering submarginal streak of dull deep tawny, enclosing a large black spot near external angle: secondaries with a broad, regular, deep, tawny discal belt, crossed by black veins and traversed by a series of eight rather small black spots; outer border chocolate-brown, bounded within by a well-marked black edge: body dark chocolate-brown. Wings below chocolate-brown, becoming paler towards the outer margin; a rather thick undulated submarginal line and a narrower marginal line, both black: primaries with the subcostal area black in the cell and crossed by two greyish white spots; a pale brown suffused streak across the end of the cell, and beyond it a subcuneiform pale testaceous patch, its broadest part in the costal nervure, diffused externally and fading away as it reaches the lower radial nervure; two subcostal white spots, and six black spots with bluish-white centres crossing the disk: secondaries with the disk, from its centre to the outer margin, abruptly testaceous, tinted internally with pink, crossed in the middle by a series of eight rounded black spots with white pupils and broad pyriform chocolate zones; a white subanal litura between the submarginal and marginal lines: body below smoky brown, palpi white at the sides and black below. Expanse of wings 2 inches 9 lines.

♀. Paler than the male, the primaries with a tapering dull ochraceous streak from the costa just beyond the end of the cell to near the second median branch, and six white dots, from the costal vein to the second median interspace, parallel to the outer margin; an indistinct black spot above the subanal one; the submarginal streak replaced by an ill-defined dusky patch; the apical area smoky brown, with the outer border darker: secondaries with the broad discal belt bright ochraceous, and the outer border uniformly dark chocolate-brown; secondaries altogether paler, with the markings more strongly defined than in the male; otherwise similar. Expanse of wings 2 inches 10 lines.

Specimens examined (Figs. 5c, d, f, i)

Holotype ♂ Lifu, 77. 85 (BM); allotype ♀ as holotype; 1 ♂ Lifu (BM); 1 ♀ Loyalty (BM); 2 ♀ Lifu, Loyalty Is, LAYARD (BM); 1 ♂ Lifou, in forest, 25. xi. 1979, P. C. ROUGEOT (MNHN). Also field observations by the author: ♂♂ in hill-forest 8 km n. w. Zoangani, Lifu, 2. iii. 1983 (Fig. 5j).

Taxonomy of the forms *elsina* and *lifuana*

The taxon *lifuana* has been a subject of much uncertainty regarding distribution and status. SEMPER (1906) regards *lifuana* as a synonym of *Hypolimnas elsina*. FRUHSTORFER (1912) lists *lifuana* as a subspecies of *octocula*, yet seems uncertain regarding its relationship with *elsina*; giving mention to SEMPER's opinion, thus leaving the situation very tentative. VIETTE (1950) regards *lifuana* as synonymous with *o. elsina*, ascribing to specimens in the Muséum National d'Histoire Naturelle.

Similarly, D'ABRERA (1971) and HOLLOWAY & PETERS (1975).

The types of *elsina* and *lifuana* are quite distinct (Figs. 5a, b, c & d), yet both bear Lifu data ; however, in view of the pausity of specimens to substantiate the above, it has remained until recently a mystery as to whether the two represent allied species (or subspecies of *octocula*), or one as a variant of the other. Furthermore, the data itself, particularly regarding the *elsina* types, may be doubtful. As *elsina* has line-priority over *lifuana*, many workers have, through lack of access to the original descriptions, and/or absence of comparative material, placed *lifuana* as a synonym of *o. elsina*.

At present, *lifuana* is best regarded as at least a local form of *o. elsina*, with headquarters on Lifu Island (Fig. 4) where it may predominate over the *elsina* form. Indeed, certain populations on Lifu may be pure *lifuana*, whilst others could show mixed representations including intermediate variants (Fig. 5i). Until field observations are implemented with regard to the constancy of wing pattern and local predominance of *lifuana*, this taxon should be afforded almost equal importance to *elsina*.

The author is unable to detect *lifuana* as occurring on other islands of the Loyalty group (Fig. 4), i.e. Ouvéa and Maré, where pure *elsina* were observed during January and March, 1983. On the presence of *octocula* on New Caledonia, HOLLOWAY (pers. comm. 1981) states that during four months of 1971 on that island, all examples collected relate to *elsina* ; other examples observed in the field probably complied with that taxon. Similarly, ROUGEOT (pers. comm. 1981) confirms the sole occurence of *elsina* near Nouméa (New Caledonia) in 1978, also on Maré the following year ; while on Lifu, four examples of *lifuana* were seen in gallery-forest. This latter may yet be found, albeit infrequently, on New Caledonia, Ouvéa and Maré.

THE LOYALTIES lie 96 km (60 ml) east of New Caledonia and are of limestone formation, never exceeding 92 m (300 ft). Of these, Ouvéa is the most fertile : 48 km (30 ml) long by 8 km (5 ml) wide, low sandy and crescent-shaped, it encloses a large lagoon. Although the island is quite flat and has a large interior swamp, there are good areas of woodland. Lifu, 80 km (50 ml) long and 40 km (25 ml) across is the largest island in the Loyalty group. Of coral formation, there are no streams ; a notable feature being a ridge of rocks 610 m (200 ft) high, incorporating a complex of caves in which are deep freshwater pools. Maré is approximately 35 km (22 ml) long, rising in places to 92 m (300 ft) and somewhat similar to Lifu.

III. The subspecies of *Hypolimnas arakalulk*

Hypolimnas arakalulk arakalulk SEMPER **stat. n.**

Hypolimnas arakalulk SEMPER, 1906, *Iris Deutsche ent. Zeitschr.*, **18** : 253－255 ; FRUHSTORFER, 1912, *In* SEITZ, *Gr. Schmett. Indo-Austr.*, **9** : 555 (as subsp. of *H. octocula*).

Distribution : Carolines (Palaus).

Original description

SEMPER's description is included below in its original form, as it is read with greater accuracy from the German.

> Flugelweite ♂ 62 – 68 mm ; 7 Exemplar vom April bis Dezember. ♂. Oberseits reicht die braungelbe Querbindle der Vorderflügel nur bis zum ersten Medianast, sie ist breiter und weniger gebogen als bei *octocula* und *elsina* : auf den Hinterflügeln wird die Aussenrandsbindle nach Vorder- und Innenrand hin schmäler und verliert sich nach aussen allmählich in den breiten dunklen Aussenrand, während bei den beiden genannten Arten die Bindle gleich breit bleibt und vom dem dunklen Aussenrand scharf begrenzt wird. An der Vorderflügelspitze stehen 4 kleine Punkte, deren erste zwei weiss, die andern beiden schwarz mit weissem Kern sind. In der Hinterflügelbindle stehen 6 schwarze, weiss gekernte Punkte.
>
> Unterseits stehen auf den Vorderflügeln am Vorderrande der mittelzelle die gewöhnlichen 3 weissen striche, die Querbinde ist hell blassgelb, parallel dem Aussenrande steht eine Reihe von 8 Punkten, von denen die zwei zunächst der Flügelspitze, sowie die beiden in der blassgelben Bindle stehenden weiss, 3 dazwischen stehende und der letzte am Seiten eines dicht am Aussenrande laufenden schwarzbraunen gewellten Striches ist die Grund farbe bläulichgrau nach der Flügelspize hin allmahlich in die dunkle Grundfarbe übergehend, an der inneren steite zwischen den Rippen eingeschnitten. Auf den Hinterflügeln ist die Grundfarbe, besonders auf der inneren Flügelhälfte heller, die blassgelbe Bindle ist sehr schmal und reicht gelben Bindle steht. Die Punktreihe besteht hier 7 ziemlich grossen weissen, schwarz umrandeten Punkten, deren innerster doppelt ist. Die Färbung des Aussenrandes ist bläulich weiss, nach innen wellenförmig gezackt und in der Mitte von einer schwarzen wellenlinie geteilt, ganz ähnlich wei bie *bolina* und hierin sehr von den verwandten Arten der anderen Süd-seeinseln abweichend.
>
> ♀. Die Grundfarbe ist heller, die Bindle ist heller und breiter und oberseits fast ebenso hell wei underseits. Die weissen Zeichnungen in der mittelzelle der Vorderflugel sind hier auch oberseits blassgelblich sichtbar. Die bläulich weissen Punkte sind beiderseits bedeutend grösser, die Farbe des Aussenrandes ist heller als Weise Vorhanden, wie beim ♂ von der Unterseite beschrieben.

Specimens examined (Figs. 6e – g)

The type-specimens of *arakalulk* remain undetected by the author ; thus, the following are designated : —

Neotype ♂, neallotype ♀ W. SEMPER, 1864, Diadema pandamus L., Palau Islands (HEC). 1 ♂ Palau Is, 'paratype' (BM) ; 1 ♂ Palaw (Palau) Isla, 83 – 76, Purch. from G. SEMPER (BM) ; 1 ♀ Babeldaob Is, in forest, D. O. OTOBED & R. P. OWEN (Ent. Service, Palau).

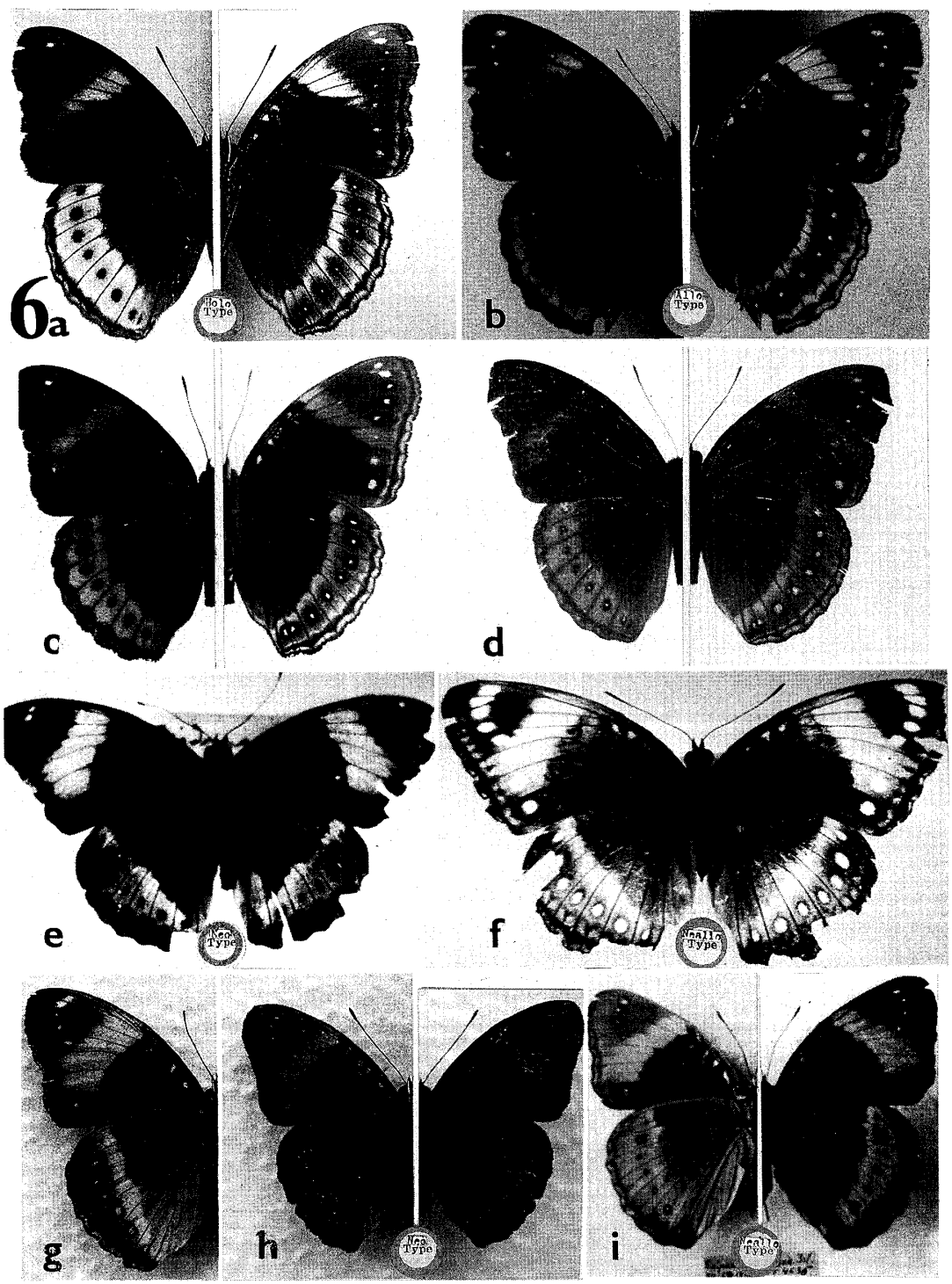

Fig. 6. **a – d**. *H. octocula tanna*: a. holotype ♂, S. New Hebrides, Tanna I, nr. Isangel, 19 – 24. i. 1976 (AME); b. allotype ♀, Tanna I, 1977 (Port-Vila); c. ♂, Tanna, 10. iii. 1964 (RNH); d. ♂, as (c) but 7. iii. 1964. **e – g**. *H. a. arakalulk*: e. neotype ♂, W. SEMPER, 1864, Palau Islands (HEC); f. neallotype ♀, data as (e); g. ♂, Palaw (Palau) Isla, 83 – 76 (BM). **h, i**. *H. arakalulk marianensis*: h. neotype ♂, Museum Paris, Saypan (Mariannes), M. A. MARCHE, 200 – 83 (BM); i. neallotype ♀, Saipan, Mariana Isl., July 30, 1920 (AMNH).

Remarks

The name Arakalulk would appear to be a Javanised form of Ngercheluuk (OTOBED, pers. comm. 1983), the old capital of Ngiwal State on the eastern side of North Babeldaob (Babelthuap) Island; the place and name are still in use. This island, largest of the Palaus (Fig. 4) is approximately 43 km (27 ml) long and 16 km (10 ml) wide, composed of old weathered volcanic rock. The highest point is 240 m (787 ft); there are a number of peaks over 200 m (656 ft). Along the west coast is a mountainous strip running north from Bokurugeru Point.

We may assume that *arakalulk*, as with *octocula* and related species, favours the forested areas to be met with on islands of elevated coral limestone. Such features occur in the southern Palaus and the Marianas, discussed next.

Hypolimnas arakalulk marianensis FRUHSTORFER **comb. n.**

Hypolimnas octocula marianensis FRUHSTORFER, 1912, *In* SEITZ, *Gr. Schmett. Indo-Austr.*, **9**: 555

Distribution: Marianas (Saipan & Guam).

Original description

> Whereas the general design is the same as in *arakalulk*, the brown-yellow bands are, especially on the h.w., narrower, and the under surface very much darker. From the Marianas Islands; some specimens are according to SEMPER contained in the Tring Mus. and in the OBERTHUÉR coll.

Specimens examined (Figs. 6h, i)

As with *arakalulk*, the type-specimens of *marianensis* are unknown to the author, thus the following treatment: —

Neotype ♂ Museum Paris, Saypan (Mariannes), M. A. MARCHE, 200－83 (BM); Neallotype ♀ Saipan, Mariana Isl., July 30, 1920 (AMNH). 1 ♀ Piti, Guam, 17. x. 1936, O. H. SWEZEY (PBM).

MUNIAPPAN (pers. comm. 1982) presents the following data: "3 specimens ex larvae collected on limestone forest plant, *Procris* sp. at Hilaan Point, Guam, 15 & 20 Aug. 1975 (Univ. of Guam)." The specific identity of the plant may be *Procris pedunculata* FORST. (1776) (Urticaceae), as recorded by STONE (1970).

Remarks

In searching the literature for further references to this exquisite insect, we find that IMMS (1943) gives general discussion to the insects of Guam, having been inspired by a survey of the insect fauna of that island. With reference to the latter, the Lepidoptera section by SWEZEY (1942) is of relevance to the present study, including some mention to *a. marianensis* (as *octocula marianensis*), representing a singular female taken at *Hibiscus* blooms by SWEZEY outside his residence at Piti, Guam on 17th October 1936. Of the fourteen species of butterfly recorded by SWEZEY, *a.*

marianensis would appear to have been the rarest.

During the 1930's a reasonable expanse of forest was present on Guam, particularly on the northern elevated limestone plateau. Regrettably, typical vegetation at present is the introduced *Leucaena* (Lead Tree), also *Casuarina* (Ironwood), *Dendrocalamus* (Bamboo), *Pandanus* (Screw Pine) plus many introduced trees and shrubs ; *Cocos* (Coconut) along some coastal strips and various other Palmae. Such a fundamental change in vegetation must facilitate a threat, and while certain species may now predominate, it is suspected that *a. marianensis* has suffered badly on Guam, for no recent records are known ; yet the insect may still thrive in the northern Marianas.

Summary

Differences between *arakalulk* and *octocula* are to be observed principally with reference to discal development of both fore and hindwing bands of the former, while the discal (outer element) of the hindwing band is obscure ; in *octocula* this area is generally paler than the adjoining band.

IV. Some notes on *Hypolimnas errabunda*

Hypolimnas errabunda HOPKINS

Hypolimnas errabunda HOPKINS, 1927, *Insects of Samoa*, **3** : 23－24, pl. 2 (5, 6).

Distribution : Western Samoa (Upolu & Savai'i Is).

Original description

> ♂ Upperside very dark brown, apical third of forewing and a broad terminal border strongly suffused with red-brown ; a series of three very small preapical white dots in interspaces 5－7 ; hindwing with a broad ochreous-brown sub -terminal border. Underside brown, apical third of forwing and a very broad postdiscal band on hindwing paler ; preapical white dots larger than on upperside, and continued as a postdiscal series of dark-ringed bluish-white spots on both wings ; sub-terminal and terminal narrow dark lines ; in cell of forewing a triangular white spot, followed by three rather irregular white lines. Cilia white, alternated with black.
>
> ♀ Similar, but paler ; on upperside preapical dots much larger than in male, and continued as a postdiscal series of white spots in all the interspaces of forewing, and very faintly in interspaces 5-7 of hindwing ; on underside markings as in male, but postdiscal white spots much larger and not bluish. Cilia as in male.

Specimens examined (Figs. 7f－h)

Holotype ♂ Malololelei, Upolu, Samoa, 2000 feet, 27. iv. 1924, BUXTON &

HOPKINS/BM Type No. RH 283/Brit. Mus. 1928－38 (BM). Allotype ♀ as holotype but 4. v. 1924/RH 284/Body re-affixed T. G. HOWARTH (BM). Paratypes: 9 ♂ 4 ♀ as holotype (HEC).

RIOTTE (pers. comm. 1984) presents the following data; all in PBM ex SWEZEY & ZIMMERMAN, from Afiama'lu, 2000 ft, Upolu, Samoa: I ♂ 14. vi. 1940 and 1 ♂ 2 ♀ 30. vi. 1940, all reared ex *?Pipturus*; 3 ♀ 14. vi. 1940, reared ex *Cypholophus*. ROBINSON (pers. comm. 1984) secured 1 ♂ in Western Samoa: Savai'i, north coast, 27. viii. 1974 (BM).

Taxonomy

HOPKINS (1927) places *errabunda* beside *H. pithoeka* KIRSCH (1877), almost treating it as a subspecies of the latter. The species does show a likeness in colouration and pattern to *pithoeka bradleyi* HOWARTH (1962) from Rennell Is (Solomons), although deviating considerably in structure and length of antennae. From his description of its life-history and the present author's examination of the type-material, the species appears closest related to *H. octocula*; with some affinity to *H. alimena* L. (1764) in spot and marginal maculation.

HOPKINS notes the parallel colouration and wing pattern to be found in *errabunda* and the Danaid, *Euploea s. schmeltzi* HERRICH-SCHÄFFER (1869); both of which fly in Western Samoa. To these, *Hypolimnas antilope lutescens* BUTLER (1874) may be added. There are similar parallel species to be found in relation to allied *Hypolimnas* of the southwest Pacific (some sex-limited), particularly in association with certain Amathusiidae, Satyridae and Danaidae (D'ABRERA, 1971; HOWARTH, *et al.*, 1976; SAMSON, *et al.*, 1982); not discounting the Heterocera.

We have examined but one male of *octocula* labelled "Samoa" (Fig. 2i); if typical of that area, it shares a subdued colouration well compared with that of *errabunda*.

Larval food-plants of *errabunda*

HOPKINS (1927) encountered its larval food-plants at various altitudes, rearing the insect after observing a female ovipositing on: "*Cudrania* sp. near *javanensis* TREC., a rather common epiphyte belonging to the URTICACEAE." *C. javanensis* is revised by CORNER (1962) and currently treated as *Maclura cochinchinensis* LOUR. (1790), of the family Moraceae. The plant is unknown to the author from the Samoan islands, where the only Moraceous genera seem to include *Artocarpus, Broussonetia, Castilloa, Ficus* and *Morus*. On Niue I, south of Samoa (Fig. 4) also occurs the genus *Streblus*, which is taxonomically closer to *Maclura* than these, and to which we relate HOPKINS' larval food-plant. The larva depicted herein (Fig. 7f) is morphlogically akin to *octocula*, deviating principally by a darker colouration, as indeed does its pupa and imago.

In addition to HOPKINS' observations, SWEZEY and ZIMMERMAN reared the species on *?Pipturus* and *Cypholophus* (refer to "Specimens examined"). The specific identities may have been *P. argenteus* or *P. velutinus* WEDD. (1854) and *C. macrocephalus* (Urticaceae), all of which occur on Upolu and are, in Vanuatu, larval food-plants for *H. octocula*.

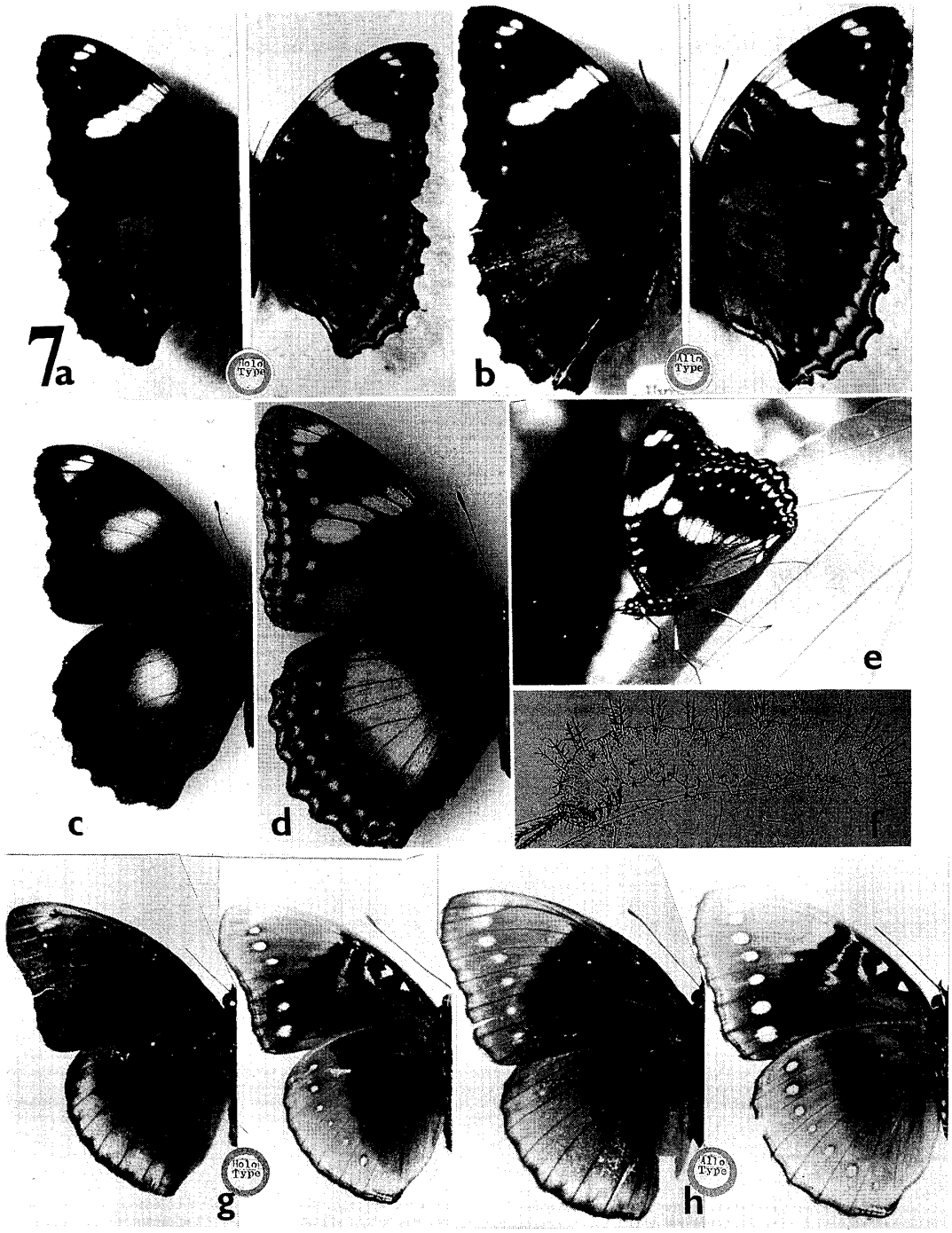

Fig. 7. **a, b**. *H. inopinata*: a. holotype ♂, Waidoi, Fiji, 15th July, 1919, H. W. SIMMONDS (AM); b. allotype ♀, data as (a) but 29th May. **c – e**. *H. bolina nerina*: c. ♂, in forest, Lake Wairafa, Santa Ana I, Solomons, 14. xii. 1974 (author); d. ♀, in littoral scrub, Feru, Santa Ana I, Solomons, 21. xii. 1974 (author); e. ♂, strand at Devil's Point, Efaté I, Vanuatu, 13. i. 1983 (author). **f – h**. *H. errabunda*: f. full-grown larva (HOPKINS, 1927); g. holotype ♂, Malololelei, Upolu, Samoa, 2000 ft, 27. iv. 1924, BUXTON & HOPKINS (BM); h. allotype ♀, data as (g) but 4. v. 1924.

V. *Hypolimnas inopinata*, a rare species from Fiji

Hypolimnas inopinata WATERHOUSE

Hypolimnas inopinata WATERHOUSE, 1920, *Proc. Linn. Soc. N. S. W.*, **45**: 468－469

Distribution: Fiji, Viti Levu (Waidoi & Nasogoto [Navai]).

Description

The original description of this fine species is somewhat extensive; however, the proceeding extract from ROBINSON (1975) should serve to substantiate our Figs. 7a, b. Apparently the taxon has, until now, never been illustrated.

> ♂: Dark blue-black with a narrow, white obilique bar across the forewing; four white subterminal spots in forewing apex; h/w. with a large, round, dark purplish-blue median spot.
>
> ♀: Similarly patterned to the ♂, but additionally two small subterminal white spots below the distal end of the white bar in the forewing.

Specimens examined (Figs. 7a, b)

Holotype ♂ Waidoi, Fiji, 15th July, 1919, H. W. SIMMONDS/KL 19339 WATERHOUSE coll. (AM). Allotype ♀ as holotype but 29th May/KL 19340 (AM).

In addition to the type-specimens, SIMMONDS took a further two examples from the same locality; these are unknown to the author, but were originally thought to have been housed at Koronivia Research Station, Nausori. Likewise one male: "Nasogoto, Navai, Fiji, caught by Mr. E. J. GODDARD, Feb., 1905" (WATERHOUSE, 1920).

Remarks

H. inopinata, a highland species, is closest related to *H. bolina* (Fig. 7c－e) with which it probably flies, as the latter is to be found throughout the Fijian islands. Here *bolina* is represented by subspecies *nerina* (♀ f. *pulchra* BUTLER [1874] predominating), exhibiting pronounced sexual dimorphism, the female paralleling *Hypolimnas misippus* L. (1764) ?subspecies and *Danaus chrysippus petilia* STOLL (1790) (Danaidae).

The sexually monomorphic design of *inopinata* in maculation, colouration and wing shape would appear to contrast highly with *bolina*. Yet on closer comparison, *inopinata* shows characters of its dorsal aspect to be met with in male and female *bolina*; i.e. purplish-blue discal areas and white forewing bands, etc. The ventral pattern is considerably modified, as is the hindwing shape, veins 2 and 3 extending marginally, broadening the tornus.

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要　　約

南太平洋島嶼に産するタテハチョウ科の *Hypolimnas octocula*（日本名 ヤホシムラサキ）群は，標本の数が少ないためもあって従来その亜種の分類が混乱していたので筆者はそれらの分類と分布に再検討を加えた．

その結果，*octocula* 群を種 *octocula* と種 *arakalulk* に二分した．さらに *octocula* の 3 新亜種（*samoa, futunaensis, tanna*）を記載・図示するとともに，*lifuana* を *o. elsina* の地方型とし，*formosa* と *pallas* をそれぞれ *o. octocula* と *o. perryi* のシノニムとした．

arakalulk は西カロリン，南マリアナ諸島産のものであるが，今回これを種に昇格させるとともに，グアム，サイパン産を亜種 *marianensis* とした．

これらの種・亜種とともに，参考のため，*octocula* 群に近縁の種 *errabunda*（西サモア）と種 *exiguus*（サンクリストバル島に産し，*octocula* とニューギニア産の種 *deois* とに共通する斑紋特徴をもつ）および一般に余りよく知られていない稀種 *inopinata*（フィジーの高地に分布し，リュウキュウムラサキに近縁のもの）を図示した．

なお，*o. octocula* の生活史をはじめとする野外観察記録を写真とともに紹介した．*o. octocula* の♂は森林地帯に多く，岸辺や草地には稀，リュウキュウムラサキやイワサキコノハ等とともに占有行動をとる．♀は目立たず，湿地・花等にも集らず，日当りのよい所にある繁みに潜って食草（イラクサ科を主とし，スベリヒユ科，トウダイグサ科等も利用される）の葉裏に卵塊を作る．幼虫は亜終齢まで群棲する．飼育した老熟幼虫は体長約 50 mm，蛹は体長約 25 mm（♂が羽化）．（文責　高倉）